

In order for the Office Action to establish a prima facie case of obviousness, at least three criteria must be met. First, there must be some suggestion or motivation, either in the references themselves or in the knowledge generally available to those of ordinary skill in the art, to modify the primary reference as proposed by the Office Action. Second, there must be a reasonable expectation of success. Third, the prior art references must disclose or suggest all the claim limitations. MPEP 2143 (emphasis added.) In addition, “the modification cannot render the [primary reference] unsatisfactory for its intended purpose or change the principle operation of the [primary] reference.” MPEP 2145 (D) (emphasis added.) For the reasons set forth below, Applicant maintains that the Office Action fails to establish a prima facie case of obviousness.

Applicant’s claim 1 describes a heat exchanger comprising “a plurality of projection portions formed on at least one of said first tube plates and on at least one of said second tube plates.” Moreover, “said plurality of projection portions project into said refrigerant path and extend in an oblique direction relative to said inner fin, wherein said inner fin is connected to said plurality of projection portions.” (Emphasis added). Similarly, Applicant’s claim 4 describes a heat exchanger comprising “a plurality of projection portions formed on at least one of said first tube plates, wherein said plurality of projection portions project into said refrigerant path and extend in an oblique direction relative to said inner fin, wherein said inner fin is connected to said plurality of projection portions.” (Emphasis added). For example, Applicant’s specification states that by forming the projection portions on the first tube plate and the second tube plate, and by extending the projection portions in an oblique direction relative to the inner fin, “the efficiency of heat transfer between air passing through the outside of the heat transfer tube and the heat exchange medium may increase without substantially increasing the resistivity of the path through which the heat exchange medium flows.” Appl’n, Page 2, Lines 6-8.

In contrast, Haruhiko describes a heat exchanger 1 which may comprise a plurality of tubes 2, and each tube 2 may comprise a first metal tube plate 4 and a second metal tube plate 4. Moreover, a pair of inner fins 53 and 54 may be positioned between the first and the second tube plates 4, and between one and four protrusions 70 may be formed on the first tube plate 4. Nevertheless, protrusions 70 do not extend in an oblique direction relative to inner fins 53 and 54. Specifically, the purpose or the principle operation of protrusions 70 is to accurately position inner fins 53 and 54 during assembly by deforming a top of inner fin 53 or 54

in direction toward the second tube plate 4. As shown in **Figs. 8a** and **8b**, during the assembly of heat exchanger 1, the first and the second tube plates 4 are brought together (**Fig. 8a**), such that the first and the second tube plates 4 contact each other at a portion 49 (**Fig. 8b**). The length of protrusions 70 is greater than a wavelength of inner fins 53 and 54, and protrusions 70 extend in a direction towards inner fins 53 and 54. Consequently, when portions 49 contact each other, each protrusion 70 contacts and deforms a top portion of inner fin 53 or 54, which accurately positions inner fins 53 or 54 during assembly.

Bossart describes a heat exchanger which may comprise a plurality of tubes 12. Each tube 12 may be formed by bending a piece of sheet metal so as to form a first tube plate 14 and a second tube plate 15. A first plurality of protrusions 33 may be formed on first tube plate 14, and a second plurality of protrusions 34 may be formed on second tube plate 15. Moreover, in an embodiment, each protrusion 33 may be slanted in a first direction, and each protrusion 34 may be slanted in a second direction, such that a first lengthwise plane which includes protrusion 33 crosses with a second lengthwise plane which includes protrusion 34. See, e.g., Bossart, Fig. 10. Specifically, Bossart states that the purpose of protrusions 33 and protrusions 34 is to create turbulence or agitation of a fluid flowing through tube 12, and that by creating turbulence, a velocity the fluid is increased, which facilitates a cooling of the fluid. See, e.g., Bossart, Column 1, Lines 28-43.

The Office Action proposes modifying protrusions 70, such that protrusion 70 are obliquely arranged. As described above, the purpose or the principle operation of protrusions 70 is to accurately position inner fins 53 and 54 during assembly by deforming a top portion of inner fin 53 or 54. Nevertheless, if protrusions 70 were obliquely angled, then protrusions 70 will contact a side portion of inner fin 53 or 54 rather than a top portion of inner fin 53 or 54, which will cause the side portion deform in a downward direction or an upward direction, depending on the angle of protrusion 70. Applicant maintains that the Office Action has not satisfied its burden of showing why those of ordinary skill in the art would be motivated to modify protrusions 70, such that protrusions 70 are obliquely angled, because the Office Action does not establish that protrusions 70 still will accurately position inner fins 53 and 54 if protrusions 70 are obliquely angled. Moreover, Applicants maintain that if protrusions 70 are obliquely angled, such that protrusions 70 deform a portion of inner fins 53 and 54 in a downward or an upward direction, protrusions 70 will apply an upward or downward force to

inner fins 53 and 54, such that inner fins 53 and 54 also will move an upward or downward direction during the assembly process. Consequently, obliquely angled protrusions 70 would not perform the function of positioning inner fins 53 and 54. Thus, Haruhiko in view of Bossart at least fails to disclose or suggest heat exchanger comprising “a plurality of projection portions formed on at least one of said first tube plates and on at least one of said second tube plates,” wherein “said plurality of projection portions project into said refrigerant path and extend in an oblique direction relative to said inner fin,” as set forth in claims 1 and 4. Therefore, Applicants respectfully request that the Examiner withdraw the obviousness rejection of claims 1 and 4.

Claims 2-3 and 5-6 depend from claims 1 and 4, respectively. “If an independent claim is non-obvious under 35 U.S.C. 103, then any claim depending therefrom is nonobvious.” MPEP 2143.03 (citations omitted). Therefore, Applicant respectfully requests that the Examiner also withdraw the obviousness rejection of claims 2-3 and 5-6.

CONCLUSION

Applicant respectfully submits that this application is in condition for allowance, and such disposition is earnestly solicited. If the Examiner believes that an interview with Applicant’s representatives, either in person or by telephone, would expedite prosecution of this application, we would welcome such an opportunity. Applicant believes that no fees are due as a result of this response. Nevertheless, in the event of any variance between the fees determined by Applicant and those determined by the U.S. Patent and Trademark Office, please charge any

such variance to the undersigned's Deposit Account No. 02-0375.

Respectfully submitted

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